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a plurality of modular inspection subsystems each configured to detect defects on a portion of a semiconductor wafer,

a mechanism for moving at least one of the semiconductor wafer and the plurality of modular inspection subsystems with respect to one another, and

a master processor configured to process data delivered from at least some of the modular inspection subsystems, wherein a first one of the plurality of modular inspection subsystems includes a local processor configured to process data collected by the first modular inspection subsystem; and

(c) a handling tool for moving the semiconductor wafers among the plurality of manufacturing tools and the inspection system.

6. In an integrated circuit manufacturing system including a plurality of interrelated integrated circuit manufacturing tools capable of operating in parallel on a plurality of semiconductor wafers, a method of inspecting a semiconductor comprising:

transferring the semiconductor wafer from one of the plurality of manufacturing tools to a modular optical inspection system that is disposed above a window of a cooling tool of the plurality of interrelated integrated circuit manufacturing tools, the modular optical inspection system being outside of a vacuum processing environment, the modular optical inspection system including a plurality of modular inspection subsystems each configured to detect defects on a portion of the semiconductor wafer, wherein the plurality of manufacturing tools comprise a cluster tool; and

moving at least one of the semiconductor wafer and the plurality of modular inspection subsystems with respect to one another such that each of the modular inspection subsystems inspects, in a single pass across the semiconductor wafer, an associated region of the semiconductor wafer.

9. A modular optical inspection system for inspecting a surface, the inspection system comprising:

a plurality of modular inspection subsystems each configured to detect defects on a portion of the surface;

a mechanism for moving at least one of the surface and the plurality of modular inspection subsystems with respect to one another, wherein at least one of the plurality of modular inspection subsystems includes

(i) a two-dimensional sensor configured to receive light from the surface; and

(ii) a controller configured to control the relative speeds at which data is read from the sensor and

the modular inspection subsystem and the surface are moved with respect to one another

such that the surface is imaged in a time-delay integration mode,

wherein all of the plurality of modular inspection subsystems include separate sensors and separate controllers, and wherein each controller causes one row of pixel data to be read from a respective two-dimensional sensor each time the at least one inspection subsystem moves by one pixel length with respect to the surface.

17. A modular optical inspection system for inspecting a surface, the inspection system comprising:

a plurality of modular inspection subsystems each configured to detect defects on a portion of the surface;

a mechanism for moving at least one of the surface and the plurality of modular inspection subsystems with respect to one another; and

a master processor configured to process data delivered from at least some of the modular inspection subsystems,

wherein a first one of the plurality of modular inspection subsystems includes a local processor configured to process data collected by the first modular inspection subsystem, also wherein the modular optical inspection system is disposed above a window of a cooling tool of a plurality of integrated circuit manufacturing tools, the modular optical inspection system being outside of a vacuum processing environment, the plurality of integrated circuit manufacturing tools being a cluster tool.

Please CANCEL claims 10 and 12 without prejudice or disclaimer.

Please ADD claim 23-38 as follows:

23. An apparatus for processing semiconductor wafers comprising:

a wafer handling module containing an internal cavity, the wafer handling module having a port;

a process tool connected to the wafer handling module through the port;

a process sensor located proximate to the port; and

a handling mechanism located within the wafer handling module configured to transport a semiconductor wafer between the wafer handling module and the process tool.

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24. The apparatus as recited in claim ~~23~~⁴³, wherein the process sensor is an inspection tool.

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25. The apparatus as recited in claim ~~24~~⁴⁴, wherein the inspection tool is a modular optical inspection system that includes,

a plurality of modular inspection subsystems each configured to detect defects on a portion of the semiconductor wafer,

a mechanism for moving at least one of the semiconductor wafer and the plurality of modular inspection subsystems with respect to one another, and

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a master processor configured to process data delivered from at least some of the modular inspection subsystems, wherein a first one of the plurality of modular inspection subsystems includes a local processor configured to process data collected by the first modular inspection subsystem.

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26. The apparatus as recited in claim ~~25~~⁴³, wherein the process sensor is a measurement tool.

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27. The apparatus as recited in claim ~~26~~⁴⁶, wherein the measurement tool measures the thickness of material layers deposited onto the semiconductor wafer.

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28. The apparatus as recited in claim ~~27~~⁴³, wherein the process tool is a single-wafer process tool or an ancillary function tool.

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29. The apparatus as recited in claim ~~28~~⁴³, wherein the handling mechanism is further configured to transport the semiconductor wafer to the process sensor.

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30. The apparatus as recited in claim ~~29~~⁴³, wherein the wafer handling module has a plurality of ports, the apparatus further comprising a plurality of process tools, each of the process tools connected to the wafer handling module through a respective port, the handling mechanism further configured to transport the semiconductor wafer between each of the plurality of process tools.

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31. The apparatus as recited in claim ~~30~~⁵⁰, wherein the processing tool is a cluster tool.

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32. The apparatus as recited in claim ~~30~~⁵⁰ wherein the processing tool is a phototrack tool.

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33. An apparatus for processing semiconductor wafers comprising:

a wafer handling module containing an internal cavity, the wafer handling module having a plurality of ports;

a plurality of process tools, each of the process tools connected to the wafer handling module through a respective one of the ports;

an inspection tool configured to detect defects on a semiconductor wafer, the inspection tool located proximate to a first one of the plurality of ports;

a thickness measurement tool configured to measure the thickness of materials deposited onto the semiconductor wafer, the thickness measurement tool located proximate to a second one of the plurality of ports; and

a handling mechanism located within the wafer handling module configured to transport the semiconductor wafer between the wafer handling module and each of the process tools.

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34. The apparatus as recited in claim 33, wherein the thickness measurement tool is a ellipsometer or a reflectometer.

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35. The apparatus as recited in claim 33, wherein the handling mechanism is further configured to transport the semiconductor wafer to the inspection tool and the thickness measurement tool.

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36. An apparatus for processing semiconductor wafers comprising:

a wafer handling module containing an internal cavity, the wafer handling module having a plurality of ports;

a plurality of process tools, each of the process tools connected to the wafer handling module through a respective one of the ports;

a detector configured to measure critical dimensions of integrated circuits upon a semiconductor wafer, the detector located proximate to a first one of the plurality of ports;

a thickness measurement tool configured to measure the thickness of materials deposited onto the semiconductor wafer, the thickness measurement tool located proximate to a second one of the plurality of ports; and

a handling mechanism located within the wafer handling module configured to transport the semiconductor wafer between the wafer handling module and each of the process tools.

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37. The apparatus as recited in claim 36, wherein the thickness measurement tool is a ellipsometer or a reflectometer.